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Biofuels Annual

Philippine Biofuels Industry Situation and Outlook

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Report Highlights:

The Philippines is a regional pioneer in renewable energy (RE) and has biofuels legislation in place that calls for the blending of ethanol and biodiesel in gasoline and diesel fuel. RE sources accounted for 43 percent of the country's primary energy mix in 2009. However, its contribution to total power supply is likely to decline in the next five years due to its comparatively higher cost and the preference of local officials to turn to familiar sources of power to address rapidly growing demand. Feedstock suppliers have had no difficulty in complying with the mandated two percent biodiesel blend due to the abundance of coconut oil in the country. Industry sources are confident they could even meet blends of up to a five percent. Compliance with the mandated ethanol blend using locally produced ethanol, however, will continue to be problematic mainly due to a lack of investment, distribution infrastructure

and uncertainty over policy considerations. As a result, ethanol imports are expected to increase through at least 2012, in order to satisfy local ethanol-blended gasoline requirements.

Post:
Manila

Executive Summary:

When Republic Act 9513 (RA 9513) or the Renewable Energy Act was signed in 2008, the country was the second largest producer of geothermal energy (next to the U.S.) and had established the first commercial wind farm in Southeast Asia. It had likewise set up the first grid-connected solar photovoltaic power plant in the region. In 2009, renewable energy (RE) sources (geothermal, biomass, hydro, wind and solar) accounted for 43 percent of the Philippine primary energy mix.

The country has experienced continued positive economic growth in recent years. However, a highly skewed income distribution pattern has meant most of the benefits of this growth have not trickled down to the masses. Increasing fuel and food prices have negatively affected the growing number of poor Filipino families. The increased demand for electricity by the growing dichotomous Philippine economy and frequent power outages are forcing the Philippine Government (GPH) to shift priority from sophisticated RE-power facilities to more traditional power plants such as those that run on coal. The anticipated issuance of less than expected feed-in-tariffs (FITs) and RE installation targets before the end of 2011 support this perceived shift. As a result, the contribution of RE power sources to the country's primary energy mix is expected to decline in the next five years.

Even before RA 9513, the country had biofuels legislation in place when Republic Act 9367 (RA 9367) or the Biofuels Act was signed in January 2007. RA 9367 mandated the blending of biodiesel and ethanol in all locally distributed diesel and gasoline. Since the 2007 legislation, compliance with the mandated biofuels blends has been mixed.

RA 9367 mandated the use of a minimum one percent biodiesel blend in all diesel fuels by February 2007, to increase to a two percent blend by February 2009. There have been no major issues in local biodiesel production and compliance, and the domestic coconut industry has expressed optimism it can supply the feedstock requirements should a higher biodiesel blend be enforced. Coconut methyl ester (CME) is the Philippine biodiesel feedstock of choice, and is derived from coconut oil (CNO). Research and development efforts in the use of *Jatropha curcas* (jatropha) is being pursued as an advanced biodiesel feedstock although a national standard for biodiesel has not yet been established.

RA 9367 also mandated that by February 2009, at least five percent ethanol shall comprise the annual total volume of gasoline sold and distributed by oil companies in the country, increasing to a ten percent blend by February 2011. Although the amount of ethanol used in gasoline increased since the legislation took effect, the percentage blend has been consistently below the mandated requirement. According to industry players, non-compliance is due to insufficient investment due to low consumer awareness, inadequate logistical and distribution systems, and a lack of clarity in the overall policy implementation plan. Additionally, delays in the issuance of updated most favored nation (MFN) tariffs on goods (including biofuels) have added uncertainty for potential fuel ethanol investors.

Due to problems in meeting the mandated ethanol blend, implementation of the 10 percent blend requirement by February, 2011 was suspended by the Philippine Department of Energy (DOE). Local

ethanol producers and oil companies were granted a six month extension to August 2011 for them to attend to logistical and infrastructure concerns. In the same DOE directive, local oil companies are allowed to import ethanol to cover shortfalls in local production through August 2015. Sugarcane is the preferred feedstock used by the Philippine bioethanol industry while cassava and sweet sorghum are alternative feedstocks currently under study.

To summarize, there are no expected Philippine biodiesel issues and compliance with the mandated blend is expected. For ethanol, however, compliance using locally produced ethanol will continue to be problematic, and more imports will be needed to comply with the mandated blend.

Author Defined:

POLICY AND PROGRAMS

Overview

This report is based on the Philippine Energy Plan (PEP) 2007-2014 prepared by the country's DOE. The proposed PEP 2009-2030 mentioned in the previous annual report is undergoing further refinements and has not been approved.

In 2009, the country's total energy mix according to the September 2010 update of the Philippine Biofuels Program (most recent available), reached 40.4 MTOE. Based on the same update, the Philippines was 59 percent energy self-sufficient in 2009, and RE sources (geothermal, biomass, hydro, wind and solar) accounted for 43 percent of the country's energy mix.

The percentage contribution of the 2009 energy sources follow:

PHILIPPINE PRIMARY ENERGY MIX - 2009	
	Percent (%)
Oil	32
Geothermal	23
Coal	17
Biomass	14
Natural Gas	8
Hydro	6
Wind & Solar	0
TOTAL	100

Source: Philippine Biofuels Program, September 2010

The Philippines has one of the highest, if not the highest, power rates in Asia, and because of the increasing number of poor Filipinos, the Philippine government (GPH) has been quite sensitive to increasing fuel prices.

Since 2001, poor households have been beneficiaries of a 'lifeline subsidy' or discounts from large power producers under the Electric Power Industry Reform Act of 2001 or Republic Act No. 9136. The

EPIRA provides households that consume less than 20 kilowatt-hours (KWh) a month a 100 percent discount, 50 percent for those using 21-50 KWh, 35 percent for those using 51-70 KWh, and 20 percent for those consuming 71-100 KWh. The subsidy was set to expire on June 26, 2011 but was extended for another 10 years by the Philippine Congress in early June 2011.

Renewable Energy

On December 16, 2008, then President Gloria Macapagal-Arroyo signed RA 9513 or the Renewable Energy Act of 2008. RA 9513 had as its declared policies the following:

- Accelerate the exploration and development of RE resources to achieve energy self-reliance, through the adoption of sustainable energy development strategies to reduce the country's dependence on fossil fuels;
- Increase the utilization of RE and promote its commercial application by providing fiscal and non-fiscal incentives;
- Encourage the development and utilization of renewable energy resources as tools to effectively prevent or reduce harmful emissions and thereby balance the goals of economic growth and development with the protection of health and the environment; and
- Establish the necessary infrastructure and mechanism to carry out the mandates specified in this Act and other existing laws.

When RA 9513 was signed, the Philippines was the second largest producer of geothermal energy (next to the U.S.) and had established the first commercial-size wind farm in Southeast Asia. It likewise had set up the first and largest grid-connected solar photovoltaic power plant in the region. According to press reports, the DOE had already awarded P88 billion (\$2 billion) worth of RE projects since the signing of RA 9513 and hopes to generate an additional \$9-10 billion worth of investments through 2020.

Section seven (7) of RA 9513 provides for FITs to be paid by consumers as compensation for RE developers that generate and infuse power into the local transmission system. Per RA 9513, the proposed FIT rates were to be in place in August 2010, but were not submitted by the National Renewable Energy Board (NREB) to the Energy Regulatory Commission (ERC) until May 2011. The NREB proposal set the FITs at P7 (\$0.16) per KWh for biomass, P6.15 (\$0.14) per KWh for hydro, P10.37 (\$0.23) per KWh for wind, P17.65 (\$0.41) per KWh for ocean energy, and P17.95 (\$0.42) for solar power. In addition, the NREB proposal also endorses a 830 Megawatt (MW) cap on RE installation projects. This is broken down as follows: hydro and biomass sectors 500 MW (or 250 MW each), wind, 220 MW; solar 100 MW; and ocean, 10 MW. The proposed FIT is a fixed rate for 20 years, and is expected to be approved before the end of 2011.

Local RE developers have been complaining over the delay in the issuance of the FITs and have repeatedly warned of pulling out their investments unless more encouraging FIT rates are granted or a higher installation target is set. The NREB, on the other hand, had claimed the use of RE would raise power costs, according to press reports.

Intermittent power outages continue to occur, particularly in Mindanao island. Power shortages in some areas in the island are common during the summer months when demand for electricity is high (for

cooling), and water supply to power hydro electric plants is low. As a result, coupled with the growing demand for electricity by the growing Philippine economy, the GPH appears to have shifted priorities from sophisticated RE-power facilities, to more conventional power plants such as coal and nuclear power. While the nuclear option has been dampened by the recent Fukushima nuclear plant disaster in Japan, more attention on traditional fuels such as coal is being given as the fastest way to increase power capacity. The DOE, according to press reports, expect an additional 2,700 MW of coal-fired generation coming in during the period 2013-2015. Coal powered plants have to comply with the Philippine Clean Air Act of 1999 (Republic Act No. 8749) whose Implementing Rules and Regulations are provided in the following link:

<http://www.chanrobles.com/philippinecleanairactrules1.htm>

Largely because of the perceived shift, the contribution of RE power sources to the country's primary energy mix are expected to decline below the 50 percent level during the 2013-2015 period.

During the launching in June 14, 2011 of the GPH's 20-year National Renewable Energy Program (NREP), incumbent President Benigno Aquino III sought to reassure the public that RE development would not lead to higher energy costs.

Biofuels

Former President Arroyo also signed RA 9367, or the Biofuels Act, on January 12, 2007. This act mandated a minimum one percent biodiesel blend into all diesel fuels within two months of the law taking effect, to increase to a two percent blend by January 2009. RA 9367 also mandated that by January 2009, at least 5 percent ethanol would comprise the annual total volume of gasoline sold and distributed by oil companies in the country, increasing to a ten percent blend by February 2011. Due to problems in meeting the mandated ten percent ethanol blend (i.e. infrastructure and logistical issues), implementation was suspended by the DOE in early 2011 and local oil companies were granted a 6 month extension to August 2011 for compliance.

The following table outlines the dates ethanol and biodiesel mandated blends became effective:

PHILIPPINE ETHANOL AND BIODIESEL MANDATES				
	Date Signed	Published	Effective	Remarks
RA 9367	1/12/2007	1/22/2007	2/06/2007	
Ethanol				
5% blend			2/06/2009*	by volume
10% blend			8/06/2011**	implementation of 10% blend
Biodiesel				
1% blend			5/06/2007	most stations sold 1% blend earlier
2% blend			2/06/2009	

* 2 years after RA9367 takes effect

** 6 months extension for petroleum industry infrastructure adjustments but exempts

certain regular gasoline grades for some motorcycles

Source: Republic Act 9367

Specific national gasoline and diesel requirements per the PEP 2007-2014 follow:

Philippine Gasoline and Diesel Demand, 2007-2014		
Year	Gasoline	Diesel
	MLi	MLi
2009	4,162	6,684
2010	4,379	6,935
2011	4,606	7,195
2014	5,363	8,035

Source: Philippine Energy Plan, 2007-2014

The following are the required biodiesel and ethanol volumes that comply with the mandated blends:

Mandated Biofuel Requirement			
	Year	Blend	Volume (MLi)
	2009	5 percent	208
Ethanol	2010	5 percent	219
	2011	10 percent	265*
	2009	2 percent	134
Biodiesel	2010	2 percent	139
	2011	2 percent	144

Note: 5 % blend for January-July plus 10 % blend for August-December

Source: Philippine Biofuels Program, September 2010

Climate Change

On May 13, 2011, President Aquino signed Executive Order No. 43 establishing 5 Cabinet clusters that will direct all efforts to address the key priority areas of his Administration. The clusters are: Good Governance and Anti-Corruption; Human Development and Poverty Reduction; Economic Development; Security, Justice and Peace; and Climate Change Adaptation and Mitigation (CCAM).

The CCAM cluster is chaired by the Secretary of the Philippine Department of Environment and Natural Resources, with the Climate Change Commission as Secretariat (CCCS), chaired by President Aquino. The CCAM cluster has the following as members:

- Chair, Housing and Urban Development Coordinating Council
- Secretary, Department of Science and Technology
- Secretary, Department of the Interior and Local Government
- Secretary, Department of Public Works and Highways
- Secretary, Department of Social Welfare and Development
- Secretary, Department of Agriculture
- Secretary, Department of Agrarian Reform
- Secretary, Department of Energy
- Secretary, Department of National Defense
- Chair, Metropolitan Manila Development Authority

Ensuring food security is the priority of the Philippine Department of Agriculture (DA) for the farm sector. Hence, the DA and the CCC have placed adaptation and disaster management as the priority agricultural climate change concern. This observation was confirmed by the recent visit to the Philippines by an inter-agency team under the USG's Enhancing Capacity for Low Emissions Development Strategies initiative.

ETHANOL

Production

Philippine ethanol production remains to be sugarcane based. Post uses a 65 Li/MT conversion rate in the required Ethanol PSD Table and a sugarcane co-product (bagasse) recovery rate of 300 kilos (kg) per ton cane.

Local ethanol production continues to be problematic and output in 2010 (9.9 MLi) was lower than expected due to inadequate investments, and is based on the 2010 Biofuels Report of the NBB. There were 3 ethanol distilleries in 2010 with a combined capacity of around 75 million liters (MLi). Only a couple, however, were in production through May 2010, with the third facility basically under commissioning during the second half of 2010. The largest among the 3 existing distilleries ceased ethanol production operations in mid-2010 as a result of losses reportedly due to increasing sugar prices as well as stiff competition from imported ethanol from Brazil and Thailand. The local industry has been asking for higher tariffs to encourage more investments as a result (see TRADE, Ethanol).

For 2011, production is expected to increase from the previous year's level although the NBB notes there was no ethanol production in the first quarter of the year. Sugar prices have stabilized and infrastructure improvements instituted by oil companies mentioned in the POLICY Section are likely to enhance ethanol distribution and consumption in 2011. While the improvements are expected to enhance competitiveness of the industry, production will still be way below the desired level due to the inadequate capacity of operating distilleries. The 2011 production estimate in the Ethanol PSD Table reflects the NBB projection for the year.

Ethanol production in 2012 will again likely increase from the 2011 level due to the expected operations of 2 more distilleries (with a combined 92 MLi capacity). Local production, however, is still expected to be way below ethanol demand. Overall ethanol distilling capacity would be approximately 165 MLi although production is expected to be below plant capacity during the year due to plant fine-tuning and debugging operations. Following are ethanol distilleries in the pipeline.

PIPELINE PROJECTS - BIOETHANOL PRODUCTION, as of Dec, 10, 2010					
			Area	Rated	Estimated
Distillery		Target Year	Required	Capacity	Investment
	Feedstock	of Operation	(Has.)	MLi/Year	(Billion P)
1. Green Future Innovations, Inc.	Sugarcane	2012	11,000	54	6.1
2. Cavite Biofuels Producers, Inc.	Sugarcane	2012	6000	37.5	4.2
3. Fuel Inc.	Sugarcane/	2013	7000	30	4.0
	Molasses				
4. Negros Biochem	Sugarcane	2013	30000	120	8.2
5. Biofuels International	Sugarcane/	-	2000	37.5	3.8
	Molasses				
6. Canlaon Alcogreen Corp.	Sugarcane/	2013	2300	30	3.6
	Molasses				
7. JG Summit	Molasses	-	-	30	1.3
8. Central Luzon Bioenergy Inc.	Sugarcane	-	50000	150	13.5
9. First Pampanga Biofuels Corp.	Cassava/	-	13,400	60	3.3
	Sweet Sorghum				

Source: 2010 Biofuels Report, National Biofuels Board

Consumption

Ethanol consumption started in 2008 or one year before the implementation of the 5 percent blend, and was sold by local oil companies on a purely voluntary basis. Since then, fuel ethanol consumption has been increasing, although local production has consistently fallen below the mandated ethanol requirement. According to the industry players, non-compliance is due to insufficient production, low consumer awareness, inadequate logistical and distribution systems, and lack of clarity in overall policy implementation.

Despite the compliance problems, the NBB endorsed and the DOE has approved the 10 percent ethanol mandated blend but are providing ethanol producers and oil companies a transition period of 6 months

to attend to distribution and logistics infrastructure concerns. The E10 blend will be fully implemented August 2011 and ethanol imports will be allowed to cover local production deficits through August 2015.

In 2010 (latest data available), there were 6.6 million registered motor vehicles, 7 percent higher than the previous year's level, according to data from the Philippine Land Transportation Office. Motorcycles/tricycles, utility vans and cars accounted for 52, 26 and 12 percent share, respectively, of overall registered motor vehicles in 2010.

NO. OF REGISTERED MOTOR VEHICLES BY TYPE					2010	%Change
MV Type	2007	2008	2009	2010	% Share	2010/09
Cars	751,092	761,919	780,252	808,583	12.19	3.63
UV	1,602,619	1,595,162	1,643,878	1,700,795	25.63	3.46
SUV	192,991	198,497	221,980	261,213	3.94	17.67
Truck	281,261	296,276	311,582	317,903	4.79	2.03
Buses	30,159	29,745	33,033	34,933	0.53	5.75
MC/TC	2,647,574	2,982,511	3,200,968	3,482,149	52.48	8.78
Trailer	24,356	27,162	28,740	29,279	0.44	1.88
TOTAL	5,530,052	5,891,272	6,220,433	6,634,855	100	6.66

Notes: MV – Motor vehicle

UV - Utility vehicle

SUV – Special utility vehicle

MC/TC – Motorcycles/Tricycles

Source of Data: Philippine Land Transportation

Local automotive manufacturers had hoped to sell 175,000 motor vehicles in 2011 although sales in the first 4 months of 2011 have shown a decline from the previous year's sales performance. While sales may recover in the second semester of 2011, overall annual sales are expected to remain flat compared to the previous year's level due to the disasters that severely hit Japan early this year. Availability of automotive assembly parts has been limited, as a result, and this is expected to constrain local production. Following is a breakdown of automotive industry sales for the January to April 2011 period.

TOTAL AUTOMATIVE INDUSTRY SALES Jan-Apr 2011					2011	2010
	Jan	Feb	Mar	Apr	Jan-Apr	Jan-Apr
Total Passenger Cars	3,997	3,859	4,570	3,868	16,294	17,667
Total Commercial Vehicles	7,049	7,613	9,205	7,948	31,815	35,296
AUV	2,132	2,629	3,532	3,024	11,317	11,493
LCV	4,566	4,732	5,442	4,759	19,499	23,101
Light Trucks	151	173	175	121	620	476
Trucks & Buses	200	79	56	44	379	226
TOTAL	11,046	11,472	13,775	11,816	48,109	52,963

Source of Data: Chamber of Automotive Manufacturers of the Philippines Inc.

With longer term implications is the policy regarding legislation on motor engine and parts. Signed by ex-President Arroyo in April 2010, Executive Order 877 (EO 877) or the new Motor Vehicle Development Program (MVDP) was meant to strengthen the local industry. A contentious item, among others, involves a provision that allows the re-importation of used vehicles engines and parts. The local industry has voiced its opposition although the issuance of the implementing rules and regulations (IRRs) of EO 877 have yet to be issued.

Trade

Ethanol falls under HS 2207.20.11 or Ethyl Alcohol Strength by Volume of Exceeding 99 percent, according to contacts from the Philippine Tariff Commission (PTC). There are no entries under HS 2207.20.11 in the Global Trade Atlas (GTA), however, and the figure in the following trade matrix represent imports under the general heading for alcohol of any strength (HS 2207.20). Imports under HS 2207.20 in 2010 reached 158,776 MT, more than double the imports during the previous year.

PHILIPPINE IMPORT STATISTICS (MT) Jan-Dec 2008-2010			
HS 220720 - Ethyl Alcohol & Other Spirits, Denatured, Of Any Strength			
	2008	2009	2010
South Korea	2,250	14,305	54,536
Singapore	919	7,955	35,188
China	5,026	6,001	22,340
United States	20	98	14,997
Pakistan	10,584	992	7,116
Indonesia	76	3,777	6,407
Thailand	2,341	0	4,847
Netherlands	4,849	0	4,406
Cambodia	0	8,854	1,706
Brazil	3,985	2,454	0
Taiwan	102	2,620	0
Others	<u>669</u>	<u>0</u>	<u>7,233</u>
TOTAL	30,821	47,056	158,776

Source: Global Trade Atlas

Ethanol imports were converted from MT to MLi using the rate of 1MT:1267 liters in the following table.

PHILIPPINE IMPORT STATISTICS (MLi) Jan-Dec 2008-2010			
HS 220720 - Ethyl Alcohol & Other Spirits, Denatured, Of Any Strength			
	2008	2009	2010
South Korea	3	18	69

Singapore	1	10	45
China	6	8	28
United States	0	0	19
Pakistan	13	1	9
Indonesia	0	5	8
Thailand	3	0	6
Netherlands	6	0	6
Cambodia	0	11	2
Brazil	5	3	0
Taiwan	0	3	0
Others	0	3	0
TOTAL	38	63	192

Source: Global Trade Atlas

Imports figures for the 2008-2011 in the Ethanol PSD are based on NBB estimates while the 2012 import figure represents Post's estimate. The NBB estimate is deemed more specific and accurate as it is responsible for the monitoring of biofuels importation. As mentioned in the CONSUMPTION Section, implementation of the E10 blend has been moved to August 2011 and ethanol imports will be allowed to cover local production deficits through August 2015. Hence, 2011 ethanol imports are expected to surge from the previous year's level. Imports in 2012 are likewise expected to increase given the expected inadequacy of projected overall distilling capacity by that time.

Ethanol currently has an MFN tariff of 10 percent but may be subject to a tariff of 1 percent if the importer is DOE-accredited. Like the FITs-issue in the POLICY Section, the ethanol import duties have been a contentious issue.

MFN tariffs on goods (including biofuels) traded outside preferential agreements expired end of 2010, and have been under review since then. As mentioned in the previous annual report, the local industry group has been calling for an increase in the ethanol tariff from 1 percent to 20-30 percent citing it as an investment deterrent. The industry petition, however, has been rejected by the GPH citing the inability of local ethanol production to supply domestic requirements, according to press reports. Hence, imported ethanol will likely continue to be levied a 1-percent duty once approved in an Executive Order (EO). The updated tariff structure for the period 2011-2015, however, has yet to be finalized.

The EO will likely be released before the end of 2011 and fuel ethanol imports for the year are expected to recover and increase in the second semester. Ethanol imports in 2011 are expected to surpass the 2010 level due to the implementation of the higher mandated blend by August 2011. For 2012, despite the expected to increase in ethanol production, imports are still expected to increase from the 2011 level due to the full implementation of the 10 percent blend for the entire year.

Likewise filed at the TCP was a request/petition for the creation of a specific tariff heading under the ASEAN Harmonized Tariff Nomenclature (AHTN) for the following:

1. AHTN Code Hydrous ethanol of ethanol strength , by volume, of exceeding 94% but not

2207.20.12 more than 99%, for use as fuel in an internal combustion engine or other motive power.

2. AHTN Code Anhydrous ethanol of ethanol strength, by volume, of exceeding 93.2% and 2207.20.13 above but not more than 99%, for use as fuel in an internal combustion engine or other motive power.

The petition notes the subheading 2207.20.11 (i.e. ethyl alcohol strength by volume of exceeding 99%) is not adequate enough to describe ethanol imported by participants to the Fuel Ethanol Program. This infers some ethanol imports were being diverted to purposes other than fuel use.

Ending Stocks

No ending fuel ethanol stocks are expected through 2012.

Ethanol - Conventional & Advanced Fuels (Mil. Liters)							
Calendar Year	2006	2007	2008	2009	2010	2011	2012
Production, Total	0	0	0	25	10	29	100
Advanced Only	0	0	0	0	0	0	0
Imports	0	0	9	64	140	236	320
Exports	0	0	0	0	0	0	0
Consumption	0	0	9	89	150	265	420
Ending Stocks	0	0	0	0	0	0	0
Production Capacity – Conventional							
No. of Biorefineries	0	0	0	2	3	3	5
Capacity (Mil. Liters)	0	0	0	40	75	75	165
Capacity Use (%)	-	-	-	63%	14%	39%	61%
Production Capacity – Advanced							
No. of Biorefineries	0	0	0	0	0	0	0
Capacity (Mil. Liters)	0	0	0	0	0	0	0
Capacity Use (%)	-	-	-	-	-	-	-
Co-product Production - Conventional only (1,000 MT)							
Product Y	0	0	0	116	48	134	555
Product Z	0	0	0	0	0	0	0
Feedstock Use - Conventional (1,000 MT)							
Feedstock A	0	0	0	385	160	445	1,850
Feedstock B	0	0	0	0	0	0	0
Feedstock C	0	0	0	0	0	0	0
Feedstock D	0	0	0	0	0	0	0
Feedstock Use - Advanced (1,000 MT)							
Feedstock A	0	0	0	0	0	0	0
Feedstock B	0	0	0	0	0	0	0
Feedstock C	0	0	0	0	0	0	0
Feedstock D	0	0	0	0	0	0	0

Notes:

1. 2008-2010 imports, production, no. of distilleries and their capacities are based on the 2010 Biofuels Report by of the NBB and the September 2010 update of the Philippine Biofuels Program.
2. 2006-07 and 2011-12 numbers are Post's estimates.

MARKET FOR ETHANOL USED AS OTHER INDUSTRIAL CHEMICALS

Information for ethanol used for other industrial purposes (other than for beverages) in the Philippines is not readily available. Hence, the numbers in the flowing PSD Table are estimates by Post arrived at through discussions with industry contacts. Overall ethanol production for industrial use is estimated at 135 MLi in 2011. Of this amount, potable alcohol comprises an estimated 115 MLi.

Ethanol used for other industrial uses but not for beverages is considered inferior in quality compared to potable alcohol and are produced in smaller amounts, according to industry. This type of ethanol is used as solvents in paints, leaching agents, and in the production of sanitizers and other toiletries. Total production volume under this category in 2011 is projected at 20 MLi by an estimated 10 distilleries with a combined capacity of 100 MLi annually. Mainly due to the rapidly growing Philippine population, ethanol used for these purposes are expected to have been growing at a commensurate level (around 2 percent annually).

Ethanol Used as Other Industrial Chemicals (Mil. Liters)							
Calendar Year	2006	2007	2008	2009	2010	2011	2012
Production	18	18	19	19	19	20	20
Imports	0	0	0	0	0	0	0
Exports	0	0	0	0	0	0	0
Consumption	18	18	19	19	19	20	20
Ending Stocks	0	0	0	0	0	0	0
Production Capacity							
Capacity (Mil. Liters)	100	100	100	100	100	100	100
Capacity Use (%)	18%	18%	19%	19%	19%	20%	20%

Source: Post's estimates

BIODIESEL

Production

CME is the Philippine biodiesel feedstock, and is an oleochemical derived from CNO. CNO is derived from copra, the dried meat of the coconut. Copra meal and glycerine are by-products in the CNO extraction process. CNO has many industrial and food purposes. Oleochemicals are used in the manufacture of soaps, detergents and other cosmetic items and toiletries. Because CME has many uses, determining CME used for biodiesel production is difficult to ascertain. Conflicting data from different

sources further compound reporting.

According to industry contacts, 5 coconuts will make 1 kg of copra, which make 0.60 kg of CNO. This means 60 percent of copra weight is oil. Hence, a kg of CNO will come from 1.67 kg of copra extracted from 8.35 coconuts. The conversion of CNO to CME is 1:1. Thus, 1.11 Li of coco oil will also make 1.11 Li of CME coming from 8.35 nuts. On per liter basis, a liter CME is extracted from 7.5 nuts.

In 2010, there were 12 DOE-accredited CME biodiesel producers, according to the NBB 2010 report, with a combined annual capacity of approximately 400 MLi. Of the 12 plants, however, only eight (8) were in commercial production in 2010. By early 2011, there were only 7 biodiesel producers, according to the NBB report. Despite the reduction in the number of CME plants, biodiesel production is expected to remain fairly flat since 2009 or when the 2 percent blend was implemented, indicative of the local coconut industry's capability to provide the adequate biodiesel feedstock. Roughly over a third of overall CME production capacity is being devoted for biodiesel production.

The Philippine coconut industry continues to be optimistic on its capability to supply the copra required to make CNO for CME production. In its Biodiesel Situationer of March 2011, the Philippine Coconut Authority (PCA) reported that local CNO supply would be adequate even at the 5 percent mandated blend requirement. The PCA places CNO requirements at this blend level at 350,000 MT or about 22 percent of its current annual production capacity.

Consumption

Even before the Biofuels Law was signed in 2007, the GPH had required the use of CME-blended diesel by all GPH government vehicles. The consumption estimates for 2006-2007 are Post estimates and represent CME used during the same period. For the years 2008-2009, Post used NBB consumption estimates while demand numbers through 2012 are Post's projections.

The smooth transition from a 1 percent to a 2 percent CME blend in 2009 had raised hopes for a possible higher 5 percent blend possibly by 2011. For this to happen, however, the PCA says the higher blend should be proven technically feasible, taking into consideration the engines and fuel systems of reconditioned and refurbished vehicles, among others. The local automotive industry has reported that locally manufactured diesel-powered motor vehicles are currently designed for a 5 percent biodiesel blend.

The transport industry is the dominant oil consuming sector accounting for over half of the country's overall oil demand. Recent increasing fuel prices have resulted in higher freight and delivery costs of food items. The resulting higher food prices have serious implications. According to the Asian Development Bank, should Philippine food prices increase by 10-30 percent in 2011, the number of poor Filipinos would expand by 1.4 million to 4.9 million.

In response, President Aquino signed on April 1, 2011 Executive Order 32 (EO 32) which provides fuel subsidies to the public transportation sector. EO 32 allocates P450 million (\$10.5 million) from the special funds of the DOE for the subsidy program and is meant to provide temporary relief from the spike in fuel prices as a result of the conflicts in the Middle East and North Africa.

Trade

The PTC classifies biodiesel under the tariff heading 3824.90.90C. There are no records in the GTA under this heading, however. Imports in the following trade tables cover imports under HS 3824.90 or Other Chemical Industrial Products and Preparations of the Chemical or Allied Industries. Imports in 2010, reached 34,275 MT, higher than the 28,076 MT imports the previous year. Items under this grouping have tariffs at 3 percent, but may be imported duty-free if coming from the ASEAN-member countries.

PHILIPPINE IMPORT STATISTICS (MT) Jan-Dec 2008-2010			
HS 382490 - Chemical Products & Preparations of the Chemical or Allied Industries, NES			
	2008	2009	2010
China	14283	12019	14936
South Korea	1,316	1,265	3,136
Malaysia	1,089	1,887	2,230
Singapore	2,726	2,388	2,099
United States	3,401	1,569	2,056
Spain	65	528	1,146
Japan	1,324	1,297	1,103
Taiwan	1,032	1,341	1,015
Others	<u>6,118</u>	<u>5,782</u>	<u>6,554</u>
TOTAL	31,354	28,076	34,275

Source: Global Trade Atlas

CME imports were converted from MT to MLi using the rate of 1MT: 1136 liters, per the reporting instructions, in the following table.

PHILIPPINE IMPORT STATISTICS (MLi) Jan-Dec 2008-2010			
HS 382490 - Chemical Products & Preparations of the Chemical or Allied Industries, NES			
	2008	2009	2010
China	16	14	17
South Korea	1	1	4
Malaysia	1	2	3
Singapore	3	3	2
United States	4	2	2
Spain	0	1	1
Japan	2	1	1
Taiwan	1	2	1
Others	7	7	7
TOTAL	36	32	39

Source: Global Trade Atlas

No CME imports are reflected in the Biodiesel PSD Table as Post believes CME does not belong to this category. GTA imports under this heading were likely other chemical products considering the country is the world's top CNO exporter. Unlike ethanol, there is no provision for biodiesel importation in the Biofuels Act and this reinforces Post's position that there were likely no CME imports in 2010. Post likewise expects CME imports in 2011 and 2012 to be nil.

Ending Stocks

No ending CME stocks are expected through 2012.

Biodiesel - Conventional & Advanced Fuels (Mil. Liters)							
Calendar Year	2006	2007	2008	2009	2010	2011	2012
Production, Total	2	38	65	130	139	144	146
Advanced Only	0	0	0	0	0	0	0
Imports	0	0	0	0	0	0	0
Exports	0	0	0	0	0	0	0
Consumption	2	38	65	130	139	144	146
Ending Stocks	0	0	0	0	0	0	0
Production Capacity - Conventional							
No. of Biorefineries	10	12	12	12	12	12	12
Capacity (Mil. Liters)	150	325	325	395	395	395	395
Capacity Use (%)	1%	12%	20%	33%	35%	36%	37%
Production Capacity - Advanced							
No. of Biorefineries	0	0	0	0	0	0	0
Capacity (Mil. Liters)	0	0	0	0	0	0	0
Capacity Use (%)	-	-	-	-	-	-	-
Feedstock Use - Conventional (1,000 MT)							
Feedstock A	1	70	65	130	139	144	146
Feedstock B	0	0	0	0	0	0	0
Feedstock C	0	0	0	0	0	0	0
Feedstock D	0	0	0	0	0	0	0
Feedstock Use - Advanced (1,000 MT)							
Feedstock A	0	0	0	0	0	0	0
Feedstock B	0	0	0	0	0	0	0
Feedstock C	0	0	0	0	0	0	0
Feedstock D	0	0	0	0	0	0	0

Notes:

1. 2008-2010 imports, production, no. of distilleries and their capacities are based on the 2010 Biofuels Report by of the NBB and the September 2010 update of the Philippine Biofuels Program.

2. 2006-07 and 2011-12 numbers are Post's estimates.

ADVANCED BIOFUELS

Second- and third-generation biofuels research is a new field of study in the Philippines, and the current focus for ethanol is on the pre-treatment of cellulosic materials, C-5 sugar fermentation, and low ethanol evaporation. There are also ongoing research and development efforts on the use of sweet sorghum and cassava as alternative ethanol feedstocks. Following are comparative ethanol conversion rates sweet sorghum and cassava.

ETHANOL FEEDSTOCK	Li/MT	Yield (MT/Has.)
Sweet sorghum	50	100
Cassava	180	8

Source of Data: DA Biofuels Feedstock Program

As mentioned in the 2010 annual report, advanced biodiesel research is focused on *Jatropha curcas* (jatropha). Jatropha, as a biodiesel feedstock, is still in the research and development stage. According to the NBB, there are about 100 hectares of jatropha seed orchards or nurseries and around 1,000 hectares of jatropha plantations. An update from the Philippine Biofuels Program, however, reports that Jatropha biodiesel may not pass the Philippine National Standard for biodiesel. It has, however, the potential as fuel for slow moving locomotives such as farm machinery or for power generation purposes, according to the same update.

STATISTICAL INFORMATION

The following conversion rates were used in the Bioethanol and Biodiesel Tables:

65 Li ethanol = 1 MT of sugarcane = 300 kgs bagasse

1 Li of biodiesel = 1 Li CME

1MT ethanol = 1267 Li

1 MT biodiesel = 1136 Li

ACRONYMS

ASEAN Harmonized Tariff Nomenclature (AHTN)
Climate Change Adaptation and Mitigation (CCAM)
Climate Change Commission Secretariat (CCCS)
Coconut methyl ester (CME)
Coconut oil (CNO)
Electric Power Industry Reform Act of 2001 (EPIRA)
Energy Regulatory Commission (ERC)
Executive Order (EO)
Feed-in-tariff (FIT)

Global Trade Atlas (GTA)
Jatropha curcas (jatropha)
Kilo (kg)
Kilowatt-hours (KWh)
Metric ton (MT)
Million Liter (MLi)
Megawatt (MW)
Motor Vehicle Development Program (MVDP)
National Biofuels Board (NBB)
National Renewable Energy Board (NREB)
National Renewable Energy Program (NREP)
Philippine Coconut Authority (PCA)
Philippine Department of Agriculture (DA)
Philippine Department of Energy (DOE)
Philippine Energy Plan (PEP)
Philippine government (GPH)
Philippine Land Transportation Office (LTO)
Philippine Tariff Commission (PTC)
Republic Act 9513 (RA 9513)
Renewable energy (RE)
Republic Act 9367 (RA 9367)